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NOTES ON GEOGRAPHIC DISTRIBUTION

First specimen-based Indonesian record of the Wongat Dragonet *Callionymus zythros* Fricke, 2000 (Actinopterygii, Perciformes, Callionymidae) from Saparua Island, the Moluccas

Ruby V. Kusumah[1], Gino V. Limmon[2,3,4], Agus Priyadi[5], Dwi Febrianti[6], Kunto Wibowo[7]

1 *Research Center for Fishery, National Research and Innovation Agency, Cibinong, Jawa Barat, Indonesia*
2 *Fisheries and Marine Science Faculty, Pattimura University, Ambon, Maluku, Indonesia*
3 *Maritime and Marine Science Center of Excellence, Pattimura University, Ambon, Maluku, Indonesia*
4 *Center for Collaborative Research on Aquatic Ecosystem in Eastern Indonesia, Ambon, Maluku, Indonesia*
5 *Research Center for Conservation of Marine and Inland Water Resources, National Research and Innovation Agency, Cibinong, Jawa Barat, Indonesia*
6 *Research Center for Limnology and Water Resources, National Research and Innovation Agency, Cibinong, Jawa Barat, Indonesia*
7 *Museum Zoologicum Bogoriense, Research Center for Biosystematics and Evolution, National Research and Innovation Agency, Cibinong, Jawa Barat, Indonesia*

Corresponding author: *Kunto Wibowo (kuntowe@gmail.com)*

Abstract. A single male dragonet (32.3 mm standard length) (Callionymidae), collected from Saparua Island, the Moluccas Islands, Indonesia, is identified as *Callionymus zythros* Fricke, 2000. This specimen is the westernmost record of the species, which was previously known only from two localities, Wongat Island, Madang, Papua New Guinea and Raja Ampat Islands, West Papua, Indonesia.

Key words. Distribution, Eastern Indonesia, fish fauna, morphology, voucher specimen

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INTRODUCTION

The dragonet genus *Callionymus* (Linnaeus, 1758) is distinguished from related genera as follows: operculum without free skin flap, lateral surface of body without small dermal cirri, jaws with bands of many small villiform teeth, snout length equal to or greater than eye diameter, simple soft dorsal fin rays, gills opening dorsally, and antrorse spine at base of preopercular spine (Fricke 2001, 2016a, 2016b, 2016c). In Indonesian waters, the genus is currently represented by about 26 species (Fricke et al. 2024), 14 of which were reported by Allen and Erdmann (2024) as inhabiting reef areas. Of these, *Callionymus zythros* Fricke, 2000 has been reliably reported only from its type locality (Wongat Island, Madang Province, Papua New Guinea) and the Raja Ampat Islands, West Papua (Fricke et al. 2014; Fricke 2017; Allen and Erdmann 2024).

During an ichthyofaunal survey supported by the Faculty of Fisheries and Marine Science, Pattimura University, a single specimen of *C. zythros* was collected at Saparua Island in the Moluccas, Eastern Indonesia. The specimen is the first record of *C. zythros* in the Moluccas and the westernmost record of the species.

METHODS

An individual of *Callionymus zythros* was collected by hand net using diluted clove oil solution while scuba diving at Saparua Island in the Moluccas, Eastern Indonesia. The specimen was photographed, fixed, and preserved following Motomura and Ishikawa (2013). Its identification and classification as *C. zythros* follow Fricke (2000, 2002), and the English common name is from Froese and Pauly (2024). Meristics were determined under a Nikon SMZ745 stereomicroscope, and morphometric characters were measured point to point using needle-point digital Mitutoyo automatic digimatic solar calipers, following Fricke (1983). Standard length is expressed as SL. Sex was determined by examining the development of the urogenital papilla (in males, the urogenital papilla is long, whereas in females, it is very short and nearly invisible). The specimen was deposited in the Museum Zoologicum Bogoriense (MZB), Bogor, Indonesia.

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RESULTS

***Callionymus zythros* Fricke, 2000**
English common name: Wongat Dragonet
Figure 1

New records. INDONESIA – Maluku • Moluccas, Saparua Island, Port of Porto Haria; 03°35′08.1″S, 128° 37′06.9″E; 15–20 m depth; 10.XI.2023; K. Wibowo leg.; scuba diving using hand net; MZB 26994, 1 ♂, 70% alcohol.

Identification. The morphological features of the male specimen (32.3 mm SL) of *Callionymus* from Saparua Island agreed closely with the diagnosis of *C. zythros* by Fricke (2001, 2016a, 2016b, 2016c). First dorsal fin with 4 dorsal-fin spines; second dorsal fin with 9 unbranched soft rays, last divided at base; dorsal fin without filaments; anal fin with 8 rays, last divided at base; upper margin of preopercular spine with 5 small antrorse serrae, lower margin smooth without serrae; base of preopercular spine with strong antrorse spine; caudal fin elongate, its length slightly less than SL; third membrane of first dorsal fin without black blotch.

In addition, the overall morphological and coloration of the fresh specimen reported here (Figure 1) closely matched the drawing and color description of the holotype of *C. zythros* by Fricke (2000: figure 30) and photographs provided by Allen and Erdmann (2024: 933), as follows: yellowish-brown head and body; thorax with a triangular blackish blotch; whitish abdomen; about 6 faint brown saddles dorsally; lateral surface of body with a row of ca. 6 dark blotches below lateral line; 1st and 2nd membranes of first dorsal fin with ca. 8 oblique brown lines; anterior distal portion of 2nd and 3rd membranes of first dorsal fin each with a short black line; second dorsal fin translucent, membrane with 3 horizontal blackish broken lines; pelvic fin with median and distal rows of faint blackish blotches; pectoral fin translucent; distal half of anal fin black, with white tips; caudal fin with ca. 7 vertical rows of blackish spots; and lower margin of caudal fin blackish.

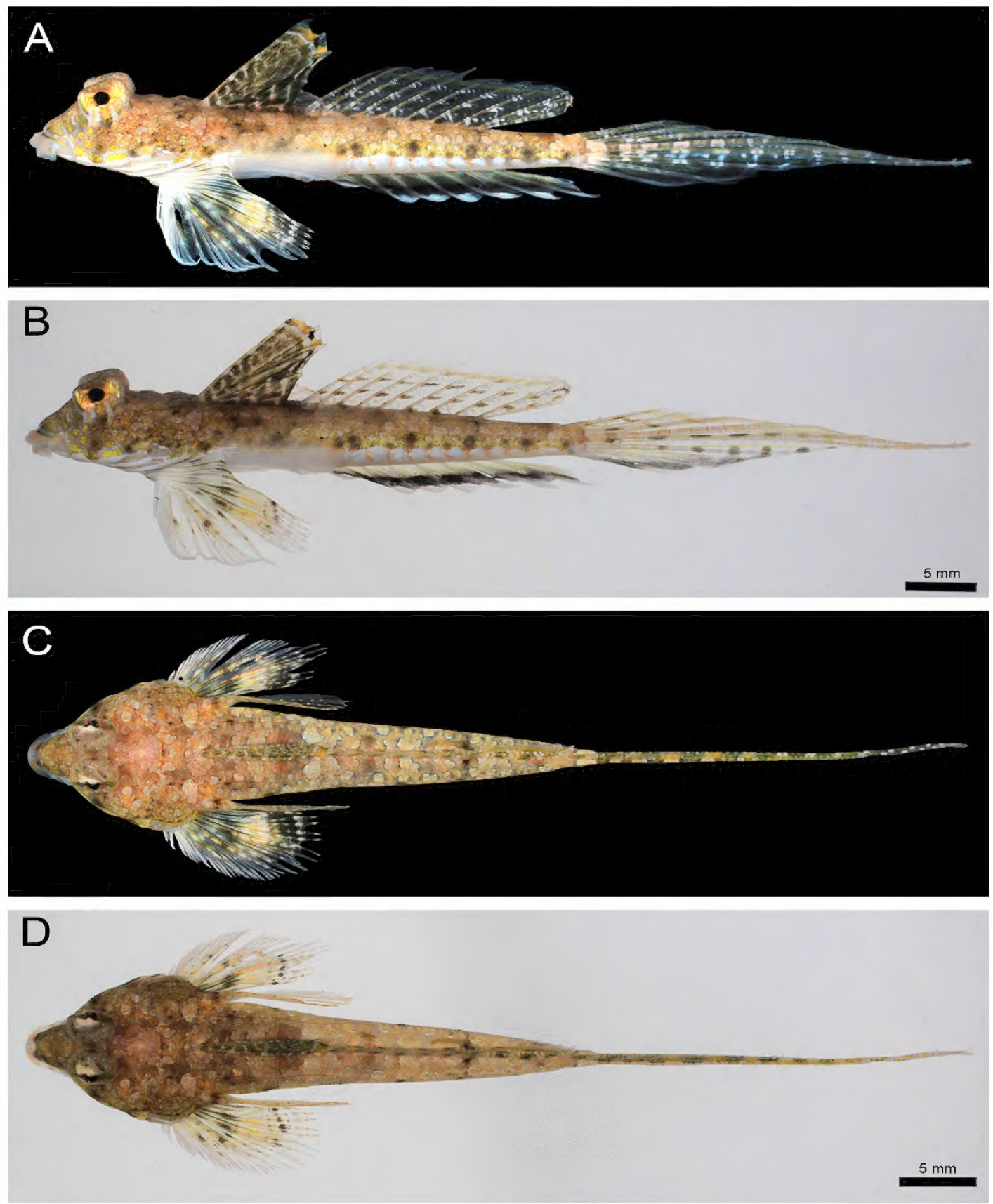

Figure 1. *Callionymus zythros*, MZB 26994, 32.3 mm SL, collected from Saparua Island, the Moluccas, Indonesia. **A, B.** Lateral views. **C, D.** Dorsal views.

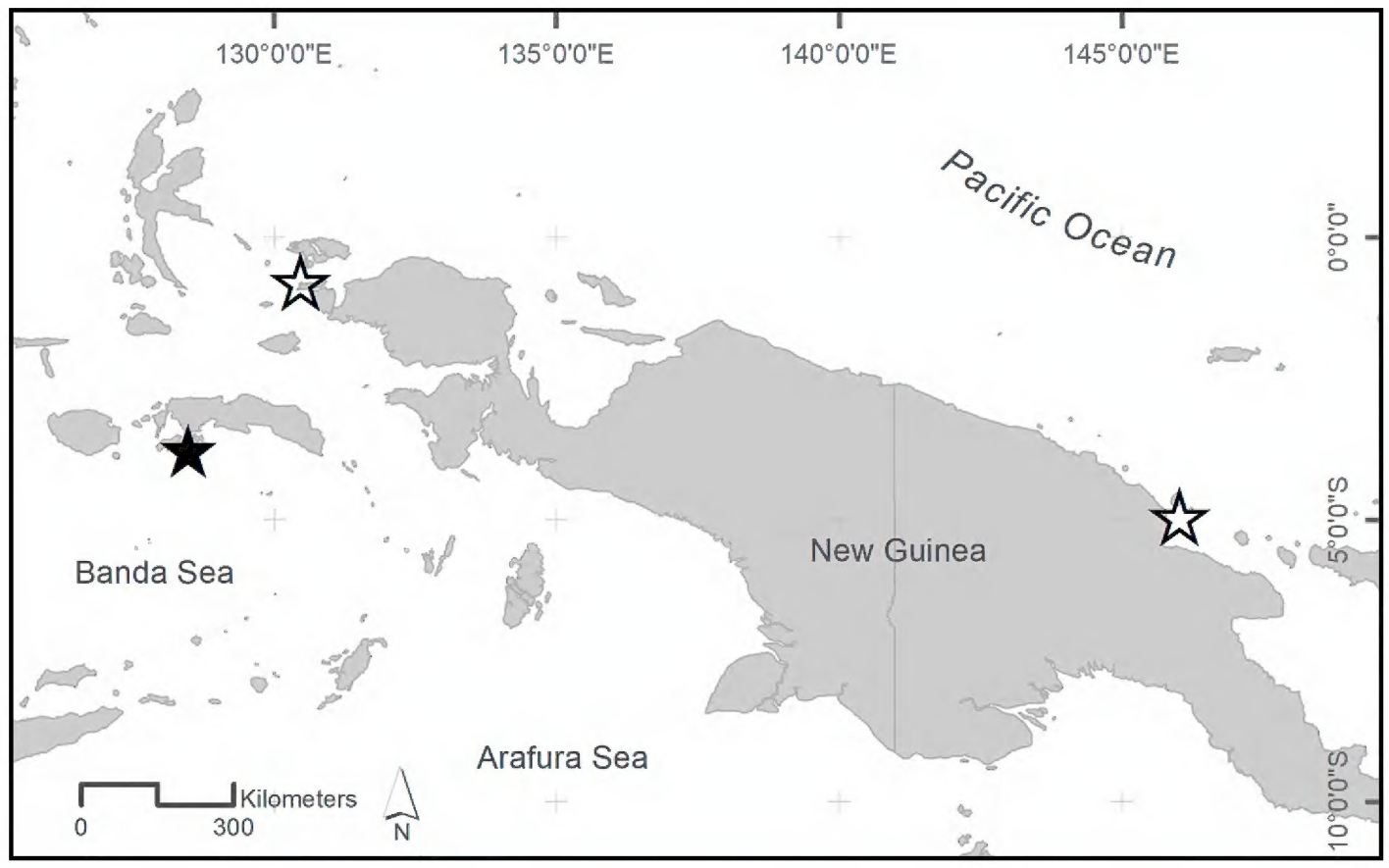

Figure 2. Distributional records of *Callionymus zythros* (open and closed stars indicate previous records (based on Allen and Erdmann 2024) and the present report, respectively).

DISCUSSION

According to Fricke (2016a, 2016b, 2016c), *Callionymus zythros* is most similar to the western Pacific species *Callionymus afilum* Fricke, 2000, *Callionymus colini* Fricke, 1993, and *Callionymus neptunius* (Seale, 1910), in having the anal fin with 8 rays, the last ray divided at the base. However, *C. zythros* is distinguishable from *C. afilum* in having the preopercular spine dorsal margin with 5 or 6 antrorse serrae (vs. 7–10 antrorse serrae in the latter) and the third membrane of the first dorsal fin without a black blotch (vs. a large black blotch on the fin), from *C. colini* in having an extremely elongate caudal fin in males, its length about equal to standard length (vs. caudal fin relatively short, length about half standard length), and from *C. neptunius* in having no spines of first dorsal fin with filaments (vs. 1st to 3rd spines of first dorsal fin with filaments in males).

Although the male of *C. zythros* is easily distinguished from the male of *C. neptunius* by the absence of filamentous spines on the first dorsal fin, its general appearance and most body coloration (see Fricke 2000: figure 30; Allen and Erdmann 2024: 933; this study: Figure 1) are similar to those of the female *C. neptunius* (see Fricke 1981: figure 5). However, the former can be readily differentiated from the latter by its lower number of antrorse serrations on the dorsal edge of the preopercular spine 5 or 6, with 5 in the Moluccas specimen (vs. 6 or 7 in *C. neptunius*) and the distal margin of the second dorsal fin being semitranslucent (vs. distinctly black) (see Fricke 1981: figure 5; Fricke 2000: figure 30; this study: Figure 1).

The discovery of *C. zythros* at Saparua Island significantly extends the known geographical range of the species; our new record is the westernmost occurrence reported to date (Figure 2). Prior to this, *C. zythros* had been documented only at Wongat Island, Madang Province, Papua New Guinea and the Raja Ampat Islands, West Papua, Indonesia (Fricke et al. 2014; Allen and Erdmann 2024).

The sandy substrate habitat of our specimen, at a depth of 15–20 m, aligns with the known habitat preferences of *C. zythros*. The species is typically found in silty sand environments at depths of 15–27 m (Fricke 2000; Fricke et al. 2014; Allen and Erdmann 2024). However, the rarity of *C. zythros* is notable, as highlighted by its initial description from a single specimen (Fricke 2000), and sole subsequent observation on an underwater photograph more than 10 years later (Allen and Erdmann 2012, 2024). This suggests that the species may have a low population density or be limited to specific habitats that are infrequently surveyed. The new record from the Moluccas adds a significant new locality to the species' distribution and may prompt further ichthyological surveys in similar habitats across the Indo-Pacific region, potentially revealing additional populations and further elucidating the biogeography of this dragonet.

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ADDITIONAL INFORMATION

Conflict of interest

The authors declare that no competing interests exist.

Ethical statement
No ethical statement is reported.

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Author contributions
Conceptualization: GVL, KW. Data curation: RVK, DF. Funding acquisition: GVL, AP, KW. Methodology: RVK, AP, DF. Visualization: AP, KW. Writing - original draft: RVK, DF. Writing - review and editing: RVK, GVL, KW. Validation: GVL, KW.

Author ORCID iDs
Ruby V. Kusumah https://orcid.org/0000-0003-4477-8482
Gino V. Limmon https://orcid.org/0000-0003-3030-7022
Agus Priyadi https://orcid.org/0000-0001-8755-7239
Dwi Febrianti https://orcid.org/0000-0002-1616-5550
Kunto Wibowo https://orcid.org/0000-0003-4465-3022

Data availability
All data that support the findings of this study are available in the main text.

REFERENCES

Allen GR, Erdmann MV (2012) Reef fishes of the East Indies. Vols. 1–3. Tropical Reef Research, Perth, Australia, 1292 pp.

Allen GR, Erdmann MV (2024) Reef fishes of the East Indies. Second edition. Vols. 1–3. Tropical Reef Research, Perth, Australia, 1466 pp.

Fricke R (1981) Two new and a rare species of the genus *Callionymus* (Teleostei: Callionymidae). Annali del Museo civico di storia naturale 'Giacomo Doria' 83: 387–400.

Fricke R (1983) Revision of the Indo-Pacific genera and species of the dragonet family Callionymidae (Teleostei). Verlag Von J. Cramer, Braunschweig, Germany, 774 pp.

Fricke R (2000) Callionymidae of New Caledonia, with remarks on related species and descriptions of 10 new species from New Caledonia, Australia, New Guinea, and Hawaii (Teleostei). Stuttgarter Beiträge zur Naturkunde, Serie A (Biologie) 617: 1–81.

Fricke R (2001) Callionymidae. In: Carpenter KE, Niem VH (Eds.) The living marine resources of the western central Pacific. Vol. 6. Bony fishes part 4 (Labridae to Latimeriidae), estuarine crocodiles, sea turtles, sea snakes and marine mammals. FAO, Rome, Italy, 3549–3571.

Fricke R (2002) Annotated checklist of the dragonet families Callionymidae and Draconettidae (Teleostei: Callionymoidei), with comments on callionymid fish classification. Stuttgarter Beiträge zur Naturkunde, Serie A (Biologie) 645: 1–103.

Fricke R (2016a) *Callionymus alisae*, a new species of dragonet from New Ireland, Papua New Guinea, western Pacific Ocean (Teleostei: Callionymidae). Fish Taxa 1: 55–66. https://doi.org/10.1007/s10228-017-0600-9

Fricke R (2016b) *Callionymus petersi*, a new species of dragonet from New Ireland, Papua New Guinea, western Pacific Ocean (Teleostei: Callionymidae). Journal of the Ocean Science Foundation 21: 38–57.

Fricke R (2016c) *Synchiropus novaehiberniensis*, a new species of dragonet from New Ireland, Papua New Guinea, western Pacific Ocean, with a review of subgenus *Synchiropus* (*Neosynchiropus*) and description of a new subgenus (Teleostei: Callionymidae). Journal of Natural History 2016: 1–26. https://doi.org/10.1080/00222933.2016.1210690

Fricke R (2017) *Callionymus boucheti*, a new species of dragonet from New Ireland, Papua New Guinea, western Pacific Ocean, with the description of a new subgenus (Teleostei: Callionymidae). FishTaxa 2 (4): 180–194.

Fricke R, Allen GR, Andréfouët S, Chen W-J, Hamel MA, Laboute P, Mana R, Tan HH, Uyeno D (2014) Checklist of the marine and estuarine fishes of Madang District, Papua New Guinea, western Pacific Ocean, with 820 new records. Zootaxa 3832 (1): 1–247. https://doi.org/10.11646/zootaxa.3832.1.1

Fricke R, Eschmeyer WN, Van der Laan R (2024) Eschmeyer's catalog of fishes: genera, species, references. California Academy of Sciences, San Francisco, USA. http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp. Accessed on 2024-7-20.

Froese R, Pauly D (2024) FishBase. World Wide Web electronic publication. Version (02/2024). www.fishbase.org. Accessed on 2024-7-20.

Motomura H, Ishikawa S (2013) Fish collection building and procedures manual. English edition. The Kagoshima University Museum, Kagoshima and the Research Institute for Humanity and Nature, Kyoto, Japan, 70 pp.